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Infant Mortality and Childhood Nutritional Status Among Afghan Refugees in Pakistan

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Boss L P (Blair Bldg, 4A01, 9000 Rockville Pike, Bethesda, MD 20892, USA), Brink E W and Dondero T J. Infant mortality and childhood nutritional status among Afghan refugees in Pakistan. *International Journal of Epidemiology*, 1987, **16**: 556–560.
In 1984 and again in 1985, systematic surveys were undertaken to evaluate infant mortality and childhood nutritional status among the Afghan refugee population in Pakistan. The entire Afghan refugee population under the administration of the United Nations High Commissioner for Refugees was sampled. Infant mortality rates were estimated to be 156 per 1000 for 1984 and 119 per 1000 for 1985. A decline was also suggested in neonatal mortality rates from 61 per 1000 for 1984 to 46 per 1000 for 1985. For neither infant nor neonatal mortality was the difference statistically significant. Improvements were seen in the percentage of children who died before their fifth birthday (22.5% in 1984 and 18.8% in 1985), in the percentage of children who were malnourished (3.5% in 1984 and 2.3% in 1985), and an increase in the percentage of children above the WHO/NCHS/CDC weight-for-height reference median (26% in 1984 and 35% in 1985). Diarrhoea was the most frequently reported cause of death for both years and was a particularly important cause of death among one-year-old children. In 1985, measles was related to 24% of the deaths and neonatal tetanus to 9% of the deaths, an increase from 8% for measles and 6% for tetanus in 1984.

In December 1978, a coup d'etat took place in Afghanistan, and segments of the population began to flee the country in the following months. Following subsequent warfare and insurgency in the countryside, refugees have continued to enter neighbouring Pakistan during the first half of this decade. It has been estimated that 2.5 million Afghan refugees now live in Pakistan[1] where their basic needs are provided by the Government of Pakistan and the United Nations High Commissioner for Refugees (UNHCR).

Because of concern about levels of infant mortality and childhood nutritional status among Afghans in refugee camps, UNHCR requested an assessment of the current nutrition status and mortality experience of the refugee children. A survey was performed in April and May of 1984 and again at the same time of year in 1985. Similar survey methodology was followed each year so that changes in rates over time could be evaluated and UNHCR would have information needed to make appropriate adjustments in programmes.

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METHODS

Sampling

In order to receive food rations, each refugee residing in the camps is registered with UNHCR as part of a family unit. At the time of our surveys there were approximately 2.5 million refugees registered residing in approximately 300 camps. A two-stage random start, skip-interval sampling method was utilized.[2] The first stage of the sample identified the districts and specific refugee camps or clusters that would be part of the sample, and the second stage identified the households to be visited within a particular camp. In each refugee camp the first household was selected blindly; then an additional 53 households were selected, consecutively moving to the next household to the left. Where there was no household located to the left, the next closest household was visited. Because of concern among the refugees that enumeration of family members could lead to decreases in rations received, interviewers took care to enumerate only children less than five years old, and assurances were provided that the information would in no way affect the rations received by the family.

Data Collection

Data were collected by three teams consisting of three to four female health visitors, young Pakistani women

trained in basic medical care and assigned to work in specific refugee camps. Throughout the survey a supervisor was available to answer questions, select households to be visited, perform anthropometric measurements, and review completed questionnaires.

Interviews of the mothers within each family were conducted by health visitors in Pashto, the language of the majority of the refugees. After residency of the various household members within a particular dwelling was determined, interviews were conducted within that dwelling. Information was collected on all living children less than five years old at the time of the survey and on those children who had died during the previous 12 months and were less than five years old at the time of death. Dates and ages were established using a calendar of Muslim holidays and local events. Neonatal and infant mortality rates and confidence limits to the rates were calculated,[3] and statistical adjustment was made for the effects of the cluster sampling methodology.[2]

Every fourth child aged 1–4 years was weighed using a Salter scale, and his or her height or length was measured with a standardized portable measuring board. Weight-for-height ratios were then compared to the WHO/NCHS/CDC reference to determine the percentage of survey children less than the median, less than 80%, and less than 70% of the reference population. In the 1985 survey, both arms of each child were examined for the presence of a scar from BCG vaccination.

Information was collected on living children less than five years old regarding diarrhoea in the seven days prior to interview. Diarrhoea was defined as more than four watery movements per day for two of the prior seven days. Mothers were also asked if the child had had measles in the past year. For children less than five years old who had died in the preceding 12 months, information collected from the mother included age at death and a history of measles occurring in the 30 days prior to death, of diarrhoea in the seven days prior to death, and of malaria in the 14 days prior to death. Finally, a series of questions concerning signs and symptoms compatible with neonatal tetanus were asked of mothers of infants who had died within 40 days of birth. A child who had died within that time period and who had sucked normally following birth, then stopped sucking, and had trouble opening his/her mouth and/or had seizures was considered to have had tetanus.

RESULTS

Refugee camps which were part of the sample were located in each of the three Provinces that have camps: Northwest Frontier Province (NWFP), Baluchistan and Punjab. During the 1984 survey, 28 of 30 selected sample sites were visited, and during the 1985 survey, 29 of 31 sites were visited. Interviews were conducted within 1512 household units in 1984 and 1566 units in 1985. Information was obtained on 2011 and 2313 living children who were less than five years old at the time of the interviews in 1984 and 1985, respectively, and 125 and 112 children who had died in the 12 months prior to the 1984 and 1985 surveys. Table 1 shows the results of the two surveys. Infant mortality decreased from 156 per 1000 live births in 1984 to 119 per 1000 live births in 1985. Ninety-five per cent confidence intervals were 125 and 186 in 1984 and 93 and 144 in 1985. Neonatal mortality decreased from 61 to 46 per 1000 live births, with 95% confidence intervals of 42 and 80 in 1984 and 30 and 62 in 1985. The percentage of children who died before their fifth birthday decreased from 22.5 in 1984 to 18.8 in 1985.

Weight and height measurements were available on systematically selected children 1–4 years of age. Of these children, 26% and 35% in 1984 and 1985, respectively, were above the median of the WHO/NCHS/CDC reference median. In 1984, 3.5% and in 1985, 2.3% had a weight-for-height ratios of less than 80% of the reference median. No children were found to be less than 70% of the reference median. In 1984, 38% and in 1985, 35% of the children had experienced diarrhoea as described in the case definition. Measles infection within the past year was reported for 24% of the children observed in 1985.

In 1985 only, the arms of the children were examined for evidence of a scar resulting from the BCG vaccine. Forty-four per cent of the NWFP and Punjab children had evidence of such a scar while only 26% of the

TABLE 1 *Survey results: Afghan refugees, 1984–1985.*

Item	1984	1985
Total families interviewed	1512	1566
Number of children <5 years old	2136	2425
Alive at time of interview	2011	2313
Died past 12 months	125	112
Number of live births in past year	595	632
Children <1 year, died past 12 months	92	75
Infant mortality rate	156/1000	119/1000
Confidence limits	125–186	93–144
Neonatal mortality rate	61/1000	46/1000
Confidence limits	42–80	30–62
Per cent dying before fifth birthday	22.5	18.8
Per cent of children weighed:		
≥median	26	35
<80% of median	3.5	2.3
<70% of median	0	0
Per cent with diarrhoea in last seven days	38	35

Baluchistan children had such evidence. The overall rate for BCG vaccination as evidenced by the scar was 41%.

Disease conditions associated with death are presented in Table 2. Within the 1984 sample population, 125 children had died in the year prior to the interview. In 1985 the corresponding figure was 112. In 1984 and 1985, respectively, 27% and 26% of the deaths occurred in the neonatal period, 46% and 41% occurred from one month of age to the first birthday, and 27% and 33% occurred from the first birthday to the fifth birthday. Diarrhoea in the week preceding death was the primary condition associated with death in both 1984 and 1985, with a reported occurrence of 39% of the deaths each year. Twenty-four per cent of the deaths in 1985 were reported to be associated with measles while only 8% had been so reported in 1984, and roughly 7% of the deaths each year were reported to be associated with malaria. In 1984, 22% of all neonatal deaths were reported to have had signs and symptoms associated with tetanus, while, in 1985, 38% of the neonatal deaths were so reported. Of the deaths described in the two years as 'Other/Unknown', 53% occurred in the neonatal period and an additional 38% occurred before the first birthday.

DISCUSSION

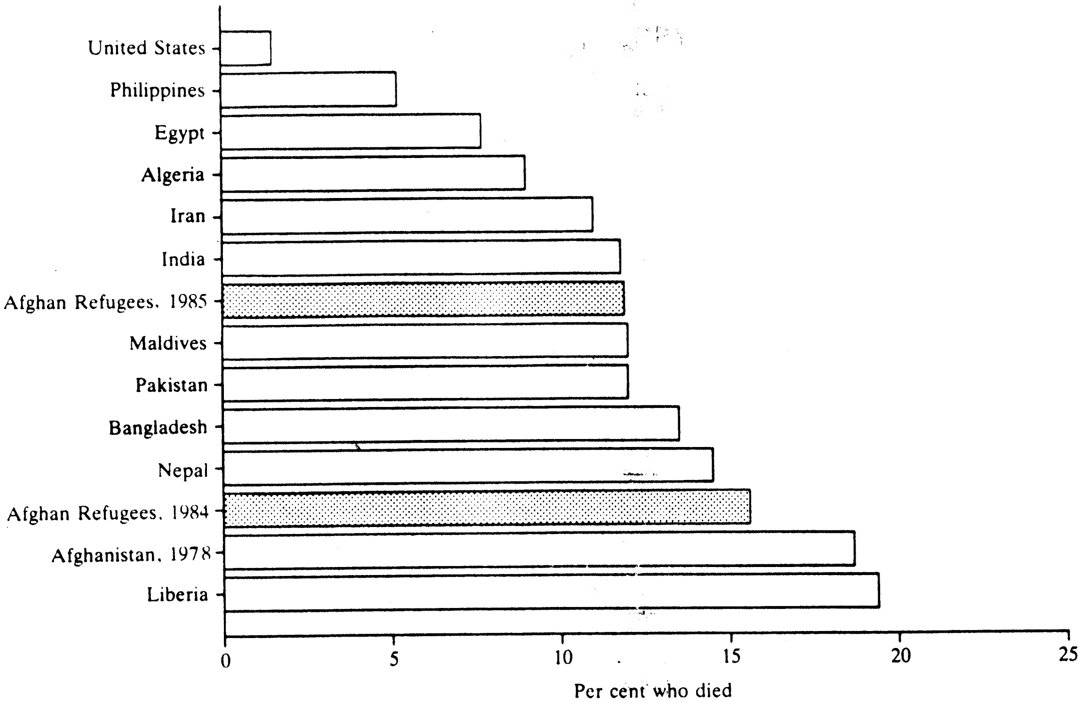
As would be expected in an area with a large number of displaced people, occasional outbreaks of civil or social unrest occur. It was because of such occurrences that two camps each year that were part of the sample could not be visited. Because several camps surrounding those not visited in 1984 were included in the sample and these camps did not differ greatly from others in the Province, it is thought that the estimates of infant and neonatal mortality were not greatly affected by the elimination of the sample sites. In 1985, an entire district was closed to us. Two camps from the district had fallen into the sample. Although we cannot be certain that those camps did not differ from camps in other NWFP districts, we do know that camps in the adjoining district did not differ markedly in 1985 nor did the sampled camps in that district differ appreciably from the rest of the province in the 1984 survey.

The decreases in neonatal and infant mortality from 1984 to 1985 were not statistically significant; however, the consistent direction of the differences in measurements between the two years provides some confidence that the differences are real. Infant mortality rates calculated from the 1984 and 1985 survey of Afghan refugees were consistent with those of other developing nations; however, a variety of methods of data collection was used in the studies represented, and, therefore, their results may not be directly comparable with those of the surveys of Afghan refugees (Figures 1 and 2). In 1985, there was an increase in the percentage of children who lived to age five, an increase in the percentage of children above the WHO/NCHS/CDC weight-for-height median, and a decrease in the percentage of the children who were malnourished. These changes correspond with apparent improvements in the physical conditions within the camps. In 1984, the majority of the families were living in tents. In 1985, most families had permanent dwellings, and there appeared to be more livestock and vegetable gardens within the compounds than during the previous year. In 1985, enclosed water supplies were available within some of the camps, and some camps close to urban areas even had electricity.

Diarrhoea continues to be the primary cause of death in children in he refugee camps as it is thoughout the developing world.[4] Despite the apparent improvements in living conditions in many of the camps, there was no change from 1984 to 1985 in the percentage of living children who had experienced diarrhoea in the week prior to interview nor in the percentage of children who had died who had had diarrhoea in the week preceding death. Deaths reportedly related to diarrhoea were particularly common in one-year-old children. These deaths were potentially preventable with

TABLE 2 *Disease problems possibly contributing to death of Afghan refugees less than five years old, 1984–1985.*

	<1-year-old				1-<5-year-olds				All ages			
	1984		1985		1984		1985		1984		1985	
Disease	No	(%)	No	(%)	No	(%)	No	(%)	No	(%)	No	(%)
Tetanus	8	(9)	11	(15)	0	—	0	—	8	(6)	11	(10)
Measles	4	(4)	5	(7)	6	(18)	22	(59)	10	(8)	27	(24)
Diarrhoea	28	(31)	33	(44)	21	(62)	11	(30)	49	(39)	44	(39)
Malaria	9	(10)	3	(4)	1	(3)	3	(8)	10	(8)	6	(5)
Unk/Other	42	(46)	23	(31)	6	(18)	1	(3)	48	(38)	24	(21)
Total	91	(100)	75	(101)	34	(101)	37	(100)	125	(99)	112	(99)



Sources: U.N. Statistical Yearbook, 1980, 1981; Population Bulletin of the U.N., 1982; CDC Data.

FIGURE 1 *Percentage of children who died before their first birthday.*

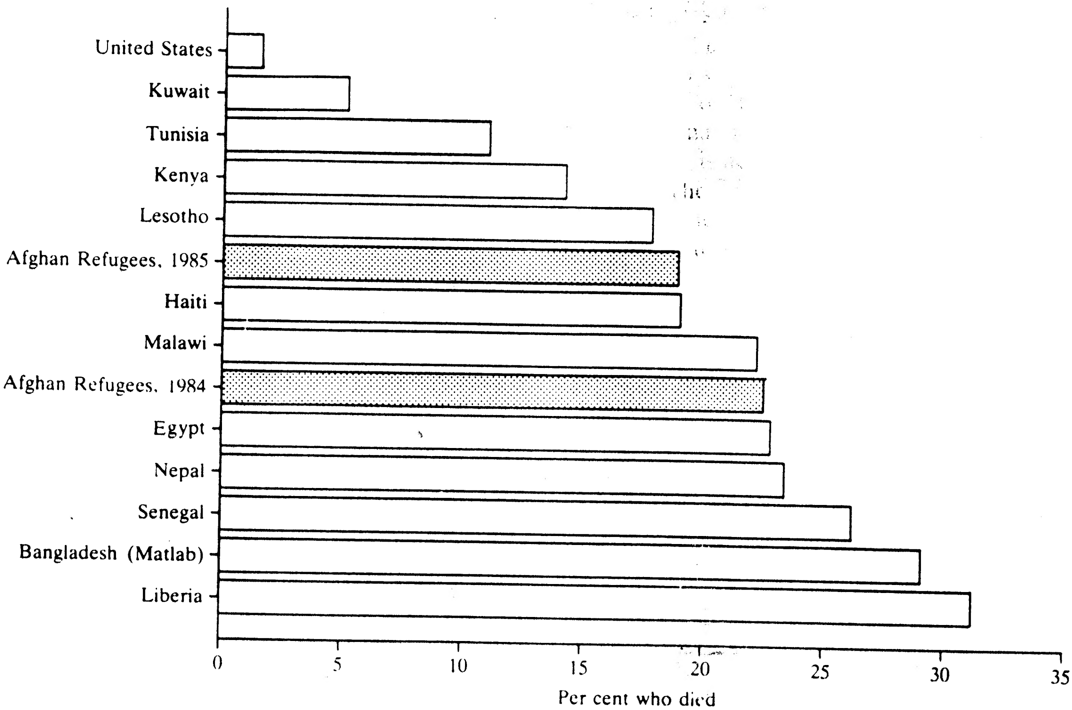
the use of oral rehydration salts which are readily available through the camp health clinics.

An increase was seen from 1984 to 1985 in the occurrence of vaccine-preventable diseases as a probable cause of death. The percentage of all neonatal deaths attributable to tetanus increased from 22% to 38%; however, the number of cases reported in the sample population was small (8 in 1984 and 11 in 1985). In 1985 there were 17 neonatal tetanus deaths per 1000 live births within the sample population. It has been estimated that there are 100 000 to 150 000 deaths from neonatal tetanus each year in the developing world. The global Expanded Program on Immunizations (EPI) which is coordinated by the World Health Organization has set a goal of less than one death per 1000 live births from neonatal tetanus by 1990 and no deaths from that cause by the year 2000.[5]

In 1984, 10 deaths were reported to have been associated with measles while in 1985, 27 deaths were so reported. In 1985, 24% of the living children had measles in the previous year. It is estimated that 900 000 deaths from measles occur each year in the developing world.[4] Measles can case serious complications including an interaction with diarrhoeal disease and malnutrition which can increase the morbidity and mortality from each condition. However, measles is preventable through the use of vaccine, and the EPI is developing a plan for global eradication.[6]

Each child in the sample population was examined for evidence of previous vaccination with BCG vaccine only in the 1985 survey. It was thought that the presence of such a scar could be an indication of the person's prior access to immunizations. Less than half of all children had a scar, and frequency of scars varied considerably by the geographical location of the camp. In the province of Baluchistan where only 26% of the refugee children had a scar, infant mortality was double that of the other provinces. Since BCG is typically the first of the recommended immunizations, the BCG scar prevalence would tend to overestimate the rate of full immunization. Clearly, an increased emphasis on disease prevention through immunizations is needed for the refugee population.

The results of these surveys are important not only to guide the relief efforts for the Afghan refugees but also to guide the UNHCR in its allocation of scarce resources. Current estimates of the worldwide refugee population reach 10 000 000.[7] Even though the Afghans are the world's largest refugee population, there are numerous other demands on the food and financial resources of UNHCR such as the pressing need to support critical programmes in Africa.



Sources: U.N. Statistical Yearbook, 1980, 1981; Population Bulletin of the U.N., 1982; CDC Data.

FIGURE 2 *Percentage of children who died before their fifth birthday.*

Diarrhoea, measles, malaria, and neonatal tetanus all affect young children more than adults. Based on high prevalence, high morbidity or mortality, and availability of effective control measures, these four conditions are considered high priorities for disease control in the developing world.[4] A significant impact on neonatal and infant mortality will be apparent for the Afghan refugee population if control measures are made available to all in need.

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